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NATIONAL DAM SAFETY PROGRAM. ST. JOSEPHS LAKE DAM (INVENTORY NU--ETC(U)
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Sullivan County
Black Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

St. Joseph's Lake Dam was found to have several deficiencies which require further investigation. Structural stability and seepage investigations should be undertaken. Additional monitoring of seepage and erosion at the spillway was also recommended.

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DELAWARE RIVER BASIN

ST. JOSEPHS LAKE DAM

SULLIVAN COUNTY, NEW YORK
INVENTORY No. NY 324

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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NEW YORK DISTRICT CORPS OF ENGINEERS

JANUARY 1979

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probably Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ST. JOSEPHS LAKE DAM I.D. No. NY 324
DEC #163
DELAWARE RIVER BASIN
SULLIVAN COUNTY, NEW YORK

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PHASE 1 REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	St. Josephs Lake Dam (I.D. No. NY 324)
State Located:	New York
County Located:	Sullivan
Stream:	Black Brook (tributary of Mongaup River)
Date of Inspection:	October 20, 1978

ASSESSMENT

The St. Josephs Lake Dam consists of a sandstone block masonry spillway with 2 masonry non-overflow sections. The north section is buttressed on both faces with earth fill. The visual inspection of the dam revealed a need for the following investigations:

1. Seepage investigations are required to determine the type and extent of measures needed to control the seepage observed in the earth embankment and the south masonry portion.

2. Investigate the spillway and the erosion at the base when the reservoir is drawn down below the spillway crest.

3. Investigate the structural stability of the dam. The stability analysis will determine if additional spillway capacity and/or remedial measures are required.

A consulting engineering firm should be contacted within 3 months to initiate these investigations. The investigations should be completed within 12 months. The deteriorated spillway buttresses and the mortar joints of the masonry blocks should be repaired during the next construction season. Vegetative growth on and in the vicinity of the dam should be removed immediately.

The discharge capacity of the spillway is inadequate for all flow in excess of 29% of the Probable Maximum Flood (PMF). The spillway is not considered seriously inadequate, based on the Corps of Engineer's Screening Criteria, since the dam is a gravity structure and has experienced overtopping similar to the 1/2 PMF in 1955 without failure of the dam. If unacceptable factors of safety are achieved in the stability analysis, then all screening criteria will be met and the spillway will be considered seriously inadequate. This will result in the need for additional spillway capacity and/or measures to insure the stability and safety of the structure. In the interim, continuous monitoring of the structure must be initiated during periods of high run-off and a contingency plan adopted to inform the proper authorities in the event of overtopping.

The following deficiencies were observed which require remedial action:

1. The mortar joints of the masonry blocks at the spillway crest and on the downstream face require repointing.

2. The spillway buttresses require repair to prevent further deterioration.

3. Vegetative growth surrounding the dam must be removed. A program of periodic cutting and mowing is required.

4. Initiate a program of periodic inspection and maintenance of the dam and appurtenances. Document this information and develop an operations manual.

George Koch
Chief, Dam Safety Section
New York State Department of
Environmental Conservation
NY License No. 45937

Approved By:

Col. Clark H. Benn
New York District Engineer

Date: 17 April 79

Overview of St. Josephs Lake Dam
Looking North

Overview of St. Josephs Lake Dam
Looking South

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ST. JOSEPHS LAKE DAM I.D. No. NY 324
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DELAWARE RIVER BASIN
SULLIVAN COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b . Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam and Appurtenant Structures

The St. Josephs Lake Dam consists of a sandstone block masonry spillway with 2 non-overflow sections, the north section of which is buttressed on both faces with earth fill. The maximum height of the dam is 22 feet. The length of the dam is 229 feet including a 40 feet long spillway, located 49 feet north of the south abutment. The upstream face is vertical and the downstream face drops vertically a distance of 5 feet then slopes downward at a rate of approximately 2 vertical to 1 horizontal. The elevation of the top of dam is assumed from the USGS topographic map to be 2.5 feet above lake level or 1432.5.

The ungated masonry spillway is 3 feet wide at the crest and steps down in 12 varying increments to the base. Flow over the spillway would not permit complete inspection and measurement of the spillway, however, the general shape is that of an ogee section. Two buttresses form the north and south extremities of the spillway. The spillway crest is 2.5 feet below the top of dam, assumed elevation 1430.

Two 2 feet diameter conduits with manually operated gate valves are located just north of the spilwlay. One serves as a reservoir drain, the other now abandoned, served as part of the hydroelectric generation system.

b . Location

The St. Josephs Lake Dam is located on the Black Brook in the Town of Forestburg approximately 4.5 miles south of the city of Monticello, Sullivan County, east of State Route #42.

c. Size Classification

The dam is 22 feet high, impounds 1800 acre-feet of water and is classified as an "intermediate" dam (1000 to 50,000 acre-feet).

d. Hazard Classification

The dam is classified as "high" hazard because of the presence of a number of homes approximately 1 mile downstream.

e. Ownership

The dam is owned and operated by the Sisters of St. Dominick, Town of Forestburg, New York. Telephone (914) 794-2020.

f. Purpose of the Dam

While the dam originally provided storage for power development, currently the dam is used for recreational purposes.

g. Design and Construction History

The dam was reported to have been constructed about 1905. Any other information concerning this dam was either lost or unavailable for review.

h. Normal Operating Procedures

Water flows over an ungated spillway.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi)	5.2
b. Discharge at Dam Site (cfs)	
Maximum known Flood (Diane, 1955)	1,300
Spillway at Maximum Pool (El. 1432.5)	440
Maximum Capactiy of Reservoir Drain	70
Total Discharge, Max. Pool (El. 432.5)	510
Average Daily Discharge	Unknown
c. Elevation (ft. above MSL-Datum)	
Top of Dam	1432.5
Spillway Crest	1430.0
Tailrace Channel	1407.0
d. Reservoir	
Length of maximum Pool, miles	1.33
Length of Shoreline (Spillway Crest) miles	4.55
Surface area (Spillway Crest) acres	340
e. Storage, (Acre-feet)	
Spillway Crest	1,800
Top of Dam	2,740

f. Dam

Embankment Type:	Stone Masonry	
Length (ft.)		289
Upstream slope		Vertical
Downstream slope-Vertical	up to 5 feet	
from top	then slopes to	2:1
Crest Elevation, ft.		1432.5
Crest Width, ft.		5

g. Spillway

Type:	Stepped Masonry	
Length, ft.		40
Crest Elevation MSL		1430.0

h. Regulating Outlet — Manually Operated Gate Valve

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The St. Josephs Lake Dam is located in the "Appalachian Uplands" physiographic province of New York State. This province (the northern extreme of the Appalachian Plateau) was formed by dissection of the uplifted but flat lying sandstones and shales of the Middle and Upper Devonian Catskill Delta. Relief is high to mederate. Maximum dissection occurs in the Catskill Mountain area, where only the mountain peaks approximate the original plateau surface. Drainage is generally southwest toward the Delaware River system.

b. Subsurface Investigations

No subsurface investigation could be located for this dam. However, the "Dam Report" filed by Mr. Richard L. Hyde on August 27, 1914 states that the dam is founded on slate.

The "General Soil Map of New York State" prepared by Cornell University Agriculture Experiment Station indicates that the surficial soils are Lackawanna and Wurtsboro of glacial till origin. These soils are generally stony sand silt and gravel with a trace of clay, having poor internal drainage characteristics. Boulders are also common in these soils; depth to bedrock is variable. Bedrock was observed to outcrop near the south abutment on the downstream side.

c. Embankment and Appurtenant Structures

The dam was built about 1905. No other information could be located concerning the design of the dam.

2.2 CONSTRUCTION RECORDS

No construction records are available.

2.3 OPERATION RECORDS

No maintenance or operation record or manual is available.

2.4 EVALUATION OF DATA

The data available is extremely limited. The information reported herein is based on NYS Department of Environmental Conservation files, discussion with Messers Michael Casey and Con Abery (representatives of the owner), and the visual inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of St. Josephs Lake Dam and the surrounding watershed was conducted on October 20, 1978. The weather was cloudy and the temperature ranged in the forties. The lake level was 0.2 feet above spillway crest at the time of the inspection. No flashboards were present.

b. Masonry Structure (including embankments & abutments)

The sandstone block masonry structure is generally in good condition, except the mortar of the joints has deteriorated substantially. The areas of primary concern are to joints at the spillway crest and the area south of the spillway where seepage was observed. Considerable moss growth approximately 10 feet south of the spillway and 2 feet below the lake level was evident. Adjacent to the moss area (approximately 3 feet south of the spillway) seepage was flowing through the joints at a rate of 2 to 5 gallons per minute. This flow appeared to be related solely to the joint deterioration and should be easily controlled by repointing the area (see photograph # 7). The concrete buttresses located at each end of the spillway have extensively cracked and spalled. The south buttress deterioration has progressed so far that a void near the spillway crest exists through the entire width of the buttress (see photograph # 5 & 8).

Earth embankment material was placed after the flood of August 1955 (Hurricane Diane) adjacent to the downstream face north of the spillway. Fill was also placed adjacent to the upstream face in 1975 or 1976 to replace that which had settled or eroded over the years. Considerable tree and brush growth was evident on this fill and inspection was difficult. Seepage was observed at 3 locations in the earth embankment adjacent to the outlet conduits on the downstream face. The total combined quantity of flow is estimated to be 5 to 10 gallons per minute (see photograph 9 & 10). No fine particle movement was noted. This flow may be related to the previous precipitation as the three areas were directly below a soft wet area at the top of the embankment.

c. Spillway

The spillway is constructed of stepped sandstone masonry blocks of varying heights forming somewhat of an ogee shape. Flow over the spillway prohibited complete inspection of the spillway surfaces and the immediate downstream area. Two concrete buttresses form the north and south extremities of the spillway. The top of the buttress is 2.5 feet above the spillway crest. The buttresses are severely deteriorated, however, little seepage from the spillway discharge was evident flowing through the buttresses. The crest is composed of 6 feet long and 3 feet wide masonry blocks; the joints of which are deteroirated and require recaulking. The tailrace channel is generally flat and wide, relatively free of debris with some riprap lining. Some large trees are present in the downstream channel. The area directly below the spillway appears to be eroded from the spillway discharge, to a width of 6 feet on the south side and a width of 10 feet on the north side. The depth could not be determined due to spillway discharge.

d. Regulating Outlets

Two 2 feet diameter conduits with manually operated gate valves are located north of the spillway (see photograph #2). The northern and upper conduit served as part of the hydroelectric generation system for the facility but the system is now abandoned. The lower conduit is the reservoir drain and is operational.

e. Downstream Channel

The downstream channel is the natural channel of Black Brook, a tributary of the Mongaup River. No significant debris or obstructions were observed in the channel.

f. Reservoir

There are no noticeable signs of instability in the reservoir area and no sedimentation problems were reported.

3.2 EVALUATION OF OBSERVATIONS

Although deficiencies were observed, there are no indications that the dam is in imminent danger. Some deficiencies are minor and may be corrected by maintenance forces. The more serious conditions of observed seepage have potential for deterioration and should be investigated further.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The St. Josephs Lake Dam stores water for recreations purposes. Facilities for hydroelectric generation have been abandoned. The rate of flow through the 2 feet diameter reservoir drain is set by a manually operated gate valve with control at the crest of the dam north of the spillway.

4.2 MAINTENANCE OF DAM

There is no operation and maintenance manual for the dam. The dam is in generally good condition. Some seepage was evident in the masonry portions of the dam. This appears to be caused by deteriorated mortar joints. Both spillway buttresses are deteriorated and require repair. Flow over the spillway obscured inspection of the spillway and the immediate area. Mortar joints in the spillway crest also require repair.

4.3 MAINTENANCE OF OPERATING FACILITIES

The reservoir drain is operational.

4.4 WARNING SYSTEM IN EFFECT

There is no warning system in effect or in preparation.

4.5 EVALUATION

The masonry portion of the dam is in need of repointing to control seepage and prevent movement of the sandstone masonry blocks. The spillway buttresses are deteriorated and require repair. Further inspection under low flow conditions is required to analyze the integrity of the spillway.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

St. Josephs Lake is located on Black Brook, a tributary of the Mongaup River, a tributary of the Delaware River. The total drainage area at the St. Josephs Dam is 5.2 square miles. The topography is characterized by gentle slopes interspersed by swamps.

5.2 ANALYSIS CRITERIA

For the purpose of this investigation, the design features were analyzed to determine the capacity of the spillway through the development of Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the PMF through the reservoir using HEC-1.

The unit hydrograph was defined by the Snyder Coefficients, Tp and Cp. The Probable Maximum Precipitation (PMP) was 21.0 inches (Figure 1), Hydrometerological Report (HMR #33) for a 24 hour duration, 200 square mile basin. The percentages of the PMP applied to other duration storms were interpolated from the plot of drainage area versus percent of the 24 hour, 200 square mile depth (Figure 2, HMR #33). The PMF inflow hydrograph was determined by applying the PMP to the unit hydrograph for the basin and the peak inflow was 6,800 cfs. After routing the peak inflow through the impounded storage, the peak outflow was determined to be 1,550 cfs. Half of PMF peak inflow was 3,400 cfs and the routed peak outflow was 800 cfs.

5.3 SPILLWAY CAPACITY

The ungated, stepped (12 steps of various widths) sandstone masonry spillway is 40 feet wide and the maximum head possible between the crest of the spillway and the top of the dam is 2.5 feet. The maximum computed capacity of the spillway is 450 cfs. Marks on the crest of the spillway indicate that flashboards were probably used to raise the water level of the lake one time or the other.

5.4 RESERVOIR CAPACITY

The reservoir capacity at spilwlay level is 1,800 acre-feet. The storage capacity curve is shown in Appendix D. The curve indicates a surcharge storage above the spillway crest of 940 acre-feet which is equivalent to a runoff depth of 3.4 inches over the drainage area.

5.5 FLOODS OF RECORD

The higest and lowest water levels recorded since completion of St. Josephs Lake Dam are as follows:

	Date	Elevation (feet)	Discharge (cfs)
Highest	1955	1433.5	1,300
Lowest	Unknown	Unknown	Unknown

The highest level was created by Hurrican Diane and the dam was overtopped by 1 foot (Source: Caretaker)

5.6 OVERFLOW POTENTIAL

The maximum capacities of the spillway and the reservoir drain are 450 cfs and 70 cfs respectively. The PMF outflow being 1,550 cfs, the spillway can pass only 29% of PMF and the spillway coupled with reservoir drain can pass 34% of PMF. Again, the spillway alone can pass 56% of one half PMF (800 cfs) and the spillway coupled with the reservoir drain can pass 65% of one half PMF.

The dam, therefore, will be overtopped by 15 inches and 6 inches of water due to PMF and one half PMF respectively.

5.7 EVALUATION

The spillway is inadequate to pass one half PMF. However, based on the Corps of Engineer's Screening Criteria, it is not considered seriously inadequate since the structure successfully withstood overtopping during the flood of August 1955 (similar to the 1/2 PMF event). This determination may be modified if the structural stability of the dam is found to be unsatisfactory.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The visual observations did not indicate any sign of major distress in connection with the dam. Seepage was evident in the masonry portion south of the spillway and in the earth embankemnt portion north of the spillway. Spillway buttresses and mortar joints are deteriorated. The area directly below the spillway appears to be eroded from spillway discharge. These problem areas are not yet considered to be adversely affecting the structural stability of the structure.

b. Design and Construction Data

No design computations or other data regarding the structural stability of the dam are available.

c. Operating Records

No records of operation are available and no major operational problems were reported.

d. Post-Construction Changes

Earth embankment material was placed after overtopping and erosion occurred during the flood of August 1955 (Hurricane Diane) adjacent to the downstream face north of the spillway. Fill was also placed adjacent to the upstream face in 1975 or 1976 to replace that which had eroded over the years.

e. Stability

Stability analyses were attempted with the limited information available from the visual inspection of the dam. These analyses indicate that the structure should be unstable during the 1 foot overtopping which occurred in 1955. However, the structure withstood this storm and performed satisfactorily. Therefore, the information available is insufficient to conduct a meaningful analysis of the structural stability. The stability analysis is included in Appendix F.

The dam is located in seismic zone 1, and seismic forces are not considered to be of significant magnitude to influence the stability of the structure.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 inspection of St. Josephs Lake Dam did not indicate conditions which constitute an immediate hazard to human life or property. The dam is not considered to be unstable. However, conditions of seepage, and deteriorated masonry joints and spillway buttresses may lead to the development of hazardous conditions. In addition, the spillway is adequate to pass only 29% of the PMF.

For the aforementioned reasons, St. Josephs Lake Dam required certain measures and improvements to insure a safe and stable structure.

b. Adequacy of Information

The information available is adequate for Phase 1 inspection purposes. It should be noted that the design information is extremely limited. Additional information would greatly aid in the investigation of structural stability.

c. Urgency

The following investigations should be initiated within 3 months and completed within 1 year from notification; structural stability, condition of spillway, seepage analysis. The deteriorated spillway buttresses and the mortar joints of the masonry blocks should be repaired during the next construction season. Vegetative growth in the vicinity of the dam should be removed immediately.

d. Need for Additional Investigation

To prevent the development of potentially hazardous conditions, investigations should be conducted in the following areas:

1. Investigation of the structural stability of the dam using appropriate design parameters. Investigation of the geometry of the dam and its foundation characteristics will be required.

2. Until the investigation and subsequent remedial measures, if any, are completed continuous monitoring of reservoir levels during periods of heavy rainfall and run-off must be initiated by the owner. In addition, a contingency plan must be prepared in the event of overtopping.

3. Investigations of the observed seepage in the earth embankment and the masonry portion of the dam are required to determine the type and extent of remedial measures warranted. The investigation should include periodic and systematic observations and measurements of the quantity of seepage.

4. Investigation of the spillway when the reservoir is drawn down to observe the condition of the spillway and also the erosion area at its base. The NYS Department of Environmental Conservation, Dam Safety Section will be available to assist in this investigation (Tel: (518) 457-6310).

7.2 RECOMMENDED MEASURES

a. Results of the aforementioned investigations will determine the remedial measures required.

b. After completion of the stability analysis, additional spillway capacity may be required so that the total capacity is adequate to pass the 1/2 PMF.

c. The mortar joints of the masonry blocks at the spillway crest and adjacent to the spillway on the south downstream face require re-pointing.

d. The spillway buttresses require repair to prevent further deterioration.

e. Vegetative growth on the embankment, around the reservoir drain, the downstream channel, along the upstream side of the dam north of the spillway, around the gate valve platform, and along the toe of the dam must be removed. A program of periodic cutting and mowing is required to limit root development within the embankment and aid in future inspections.

f. Initiate a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference. Also, develop an operations manual.

APPENDIX A

PHOTOGRAPHS

Photo #1
Earth Embankment & Abandoned Hydroelectric Supply Conduit
Looking East

Photo #2
Earth Embankment & Low Level Outlets
Looking East

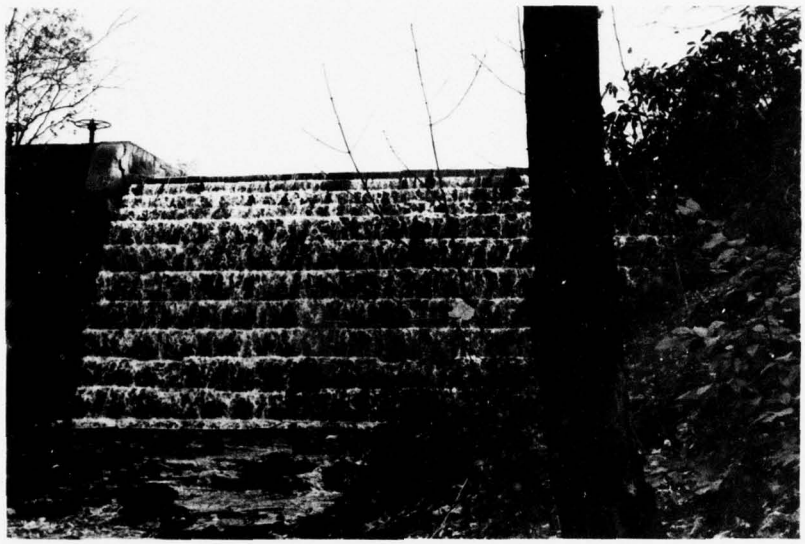


Photo #3

Spillway, Looking East

Photo #4

Gate Valve Platform, Looking South

Photo #5
South Spillway Buttress
Looking West and Down at Spillway

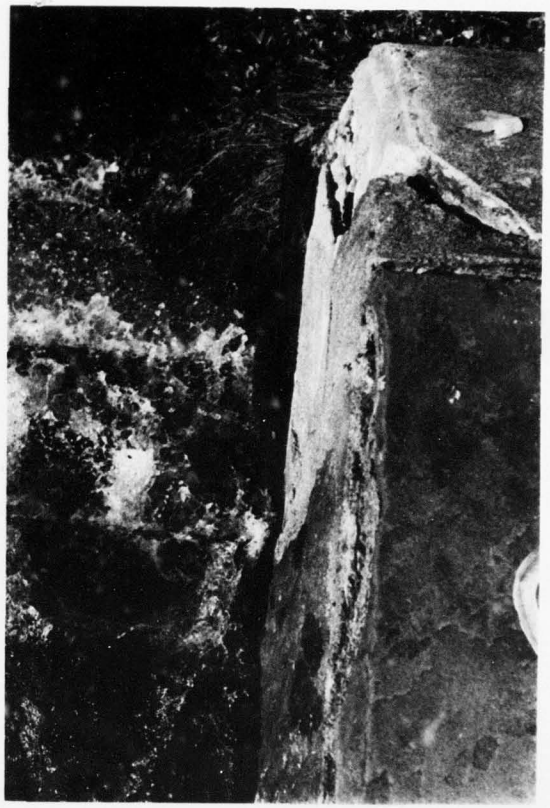


Photo #6
North Spillway Buttress
Looking West and Down at Spillway

Photo #7
Downstream Face of Masonry Section, South of Spillway
(Looking North) Note Seepage

Photo #8
Close up of Seepage Area
and Deteriorated Buttress

Photo #9

Seepage Area of Earth Embankment Adjacent to Low Level Outlets
and above Photo #10, Note Seepage at Base of Rock

Photo #10

Seepage Area of Earth Embankment Adjacent
to Hydroelectric Supply Conduit and below Photo #9
Note Seepage between Boulders in photo center

Photo #11

Downstream Channel as Viewed from Spillway
Looking West

Photo #12

Upstream Face of Dam
Looking West

APPENDIX B

ENGINEERING DATA CHECKLIST

Check List
Engineering Data
Design Construction Operation

Name of Dam ST JOSEPHS LAKE

I.D. # N.Y. 324

Item	Remarks		
	Plans	Details	Typical Sections
Dam	NONE	NONE	NONE
Spillway(s)	NONE	NONE	NONE
Outlet(s)	NONE	NONE	NONE
Design Reports	NONE		
Design Computations	NONE		
Discharge Rating Curves	NONE		
Dam Stability	NONE		
Seepage Studies	NONE		
Subsurface and Materials Investigations	NONE		

Item	Remarks
Construction History	NONE
Surveys, Modifications, Post-Construction Engineering Studies and Reports	Fill was placed by dump truck and leveled with bulldozers to replace fill that had settled and eroded over the years on the north section of the dam adjacent to the upstream face (About 1975 or 76) Additional fill may have been placed on the downstream face after overtopping occurred during the flood of 1955 (Hurricane Diane)
Accidents or Failure of Dam Description, Reports	NONE
Operation and Maintenance Records Operation Manual	NONE

APPENDIX C

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam St. Josephs Lake Dam

I.D. # NY 324 DEC# 163 Delaware River Basin

Location: Town Forestburg County Sullivan

Stream Name Black Brook

Tributary of Mongaup River

Longitude (W), Latitude (N) 74°42'-40" / 41°35'30"

Hazard Category C High

Date(s) of Inspection October 20, 1978

Weather Conditions 40's Cloudy

b. Inspection Personnel R. McCarty M. Islam

Mike Casey Con Abery

c. Persons Contacted Sisters of St. Domonick - Sisters Peggy and Mary Ann Tel. (914) 794-2020

d. History:

Date Constructed 1905

Owner Sisters of St. Domonick - St. Josephs Sanitarium

Designer Unknown

Constructed by Unknown

2) Technical Data

Type of Dam Stone Masonry with Earth Embankment

Drainage Area 5.2 Square Miles

Height 22 feet Length 229.3 Feet including 40' spillway

Upstream Slope Vertical Downstream Slope vertical (top 5') then 2:1 to base

2) Technical Data (Cont'd.)

External Drains: on Downstream Face NONE @ Downstream Toe NONE

Internal Components:

Impervious Core UNKNOWN

Drains NONE

Cutoff Type UNKNOWN

Grout Curtain UNKNOWN

3) Embankment

earth embankment placed against downstream face on north side of spillway

a. Crest

(1) Vertical Alignment indeterminate

(2) Horizontal Alignment indeterminate

(3) Surface Cracks none observed

(4) Miscellaneous

b. Slopes

(1) Undesirable Growth or Debris, Animal Burrows

Considerable tree and brush growth on earth portions

(2) Sloughing, Subsidence or Depressions

none evident

(3) Slope Protection none evident

(4) Surface Cracks or Movement at Toe none observed

(5) Seepage 3 Locations observed in the earth embankment where seepage was evident - located near the outlet conduits - flow 5 to 10 gpm from all areas - could not determine if this was related to previous day's rain or dam seepage

(6) Condition Around Outlet Structure

appears good although conduits are deteriorating

c. Abutments

(1) Erosion at Embankment and Abutment Contact none observed of significant consequence

(2) Seepage along Contact of Embankment and Abutment see seepage on slopes

(3) Seepage at toe or along downstream face none evident - brush & trees make it difficult to inspect

d. Downstream Area - below embankment

(1) Subsidence, Depressions, etc. none

(2) Seepage, unusual growth none - many large trees in downstream channel area, not believed to be a problem

(3) Evidence of surface movement beyond embankment toe none

(4) Miscellaneous

e. Drainage System

none observed

(1) Condition of relief wells, drains, etc. none observed

(2) Discharge from Drainage System none observed

4) Instrumentation

(1) Monumentation/Surveys BENCH MARK (B.M 15) LOCATED IN WESTERN SIDE OF DAM ADJACENT TO SPILLWAY PLACED BY DEPT. OF CIVIL ENGINEERING, MANHATTAN COLLEGE.

(2) Observation Wells NONE

(3) Weirs NONE

(4) Piezometers NONE

(5) Other -

5) Reservoir

a. Slopes OK.

b. Sedimentation NONE REPORTED.

6) Spillway(s) (including tail race channel)

Stepped masonry blocks of varying dimensions
see photographs - approximates an ogee section

a. General masonry block construction - crest composed of 6 ~~feet~~ long blocks - joints are deteriorated and require recaulking

b. Principle Spillway general condition unobservable due to flow over spillway
no obvious problems

c. Emergency or Auxiliary Spillway NONE

d. Condition of Tail race channel RIPRAP ON CHANNEL. CHANNEL FAIRLY FLAT AND WIDE; RELATIVELY FREE FROM DEBRIS AND DOESNOT APPEAR TO ~~HAVE~~ HAVE ANY POTENTIAL PROBLEM.
some large trees on banks of channel

e. Stability of Channel side/slopes ~~OK~~ OK

7) Downstream Channel

a. Condition (debris, etc.) RELATIVELY FREE FROM DEBRIS
some large trees

b. Slopes FAIRLY FLAT.

c. Approximate number of homes
numerous homes approximately 1 mile downstream
near NY Route #42

8) Miscellaneous

9) Structural

a. Concrete Surfaces Structure is formed of masonry blocks mortared together - mortar has deteriorated particularly in the spillway crest area and at water level on downstream face south of south buttress

b. Structural Cracking cracked and spalled buttresses located at each end of the spillway - they have been repaired in the past but have deteriorated again - south buttress, could see thru buttress because crack was so large, near top of spillway

c. Movement - Horizontal & Vertical Alignment (Settlement) none observed

d. Junctions with Abutments or Embankments no problems observed

e. Drains - Foundation, Joint, Face none observed

f. Water passages, conduits, sluices operational - conduit for facility power generation is now abandoned

g. Seepage or Leakage considerable moss growth south of south buttress on downstream face ≈ 2' below water line - seepage observed in this area (estimated 2-5 gpm) coming thru deteriorated joints in masonry blocks - principle area of seepage from buttress to 3 feet south. Additional slight seepage to 10 feet south of buttress

h. Joints - Construction, etc. masonry joints deteriorated - repoint

i. Foundation area below spillway is eroded from spillway discharge, to a width of 6 feet on the south side to 10 feet on the north side, could not determine the depth of erosion

j. Abutments good condition where observed

k. Control Gates operational

l. Approach & Outlet Channels generally free of debris see "foundation" above

m. Energy Dissipators (plunge pool, etc.) see "foundation" above

n. Intake Structures concrete gate valve structure is cracked and deteriorated, particularly the top slab - this structure is located north of the north buttress and is part of the north non-overflow masonry section

o. Stability no visual problems observed

p. Miscellaneous

APPENDIX D

HYDROLOGIC/HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1432.5	340	2,740
2) Design High Water (Max. Design Pool)	-	-	-
3) Auxiliary Spillway Crest	-	-	-
4) Pool Level with Flashboards	NO FLASHBOARDS.		
5) Service Spillway Crest	1430.0	240	1,800

DISCHARGES

	Volume (cfs)
1) Average Daily	NONE REQUIRED.
2) Spillway @ Maximum High Water TOP OF DAM	450
3) Spillway @ Design High Water	-
4) Spillway @ Auxiliary Spillway Crest Elevation	-
5) Low Level Outlet	70
6) Total (of all facilities) @ Maximum High Water	520
7) Maximum Known Flood 1955 EL. 1433.5	1,300

CREST: DAM ELEVATION: 1432.5

Type: STONE MASONRY

Width: 5 FEET Length: 189.3 FEET

Spillover STONE MASONRY, STEPPED.

Location 49.3 FEET EAST OF WEST EMBANKMENT

SPILLWAY:

PRINCIPAL		EMERGENCY
	Elevation	NONE
STONE MASONRY, STEPPED	Type	
40 FEET	Width	
	Type of Control	
YES	Uncontrolled	
	Controlled:	
—	Type (Flashboards; gate)	
—	Number	
—	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
—	Chute Length	
COULD NOT BE MEASURED.	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate _____ Sluice _____ Conduit YES Penstock NOT OPERATIONAL

Shape : CIRCULAR

Size: 2 FEET DIAMETER

Elevations: Entrance Invert _____

Exit Invert _____

Tailrace Channel: Elevation _____

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

_____

Method of Controlled Releases (mechanisms):

2 MANUALLY OPERATED ROTATING CONTROL MECHANISMS ON UPSTREAM AND WEST SIDE OF SPILLWAY. UPPER 24" DIAMETER PIPE USED FOR POWER GENERATION IS NO LONGER USABLE AND CONTROL MECHANISM NON-OPERATIONAL. LOWER 24" DIAMETER PIPE USED FOR DRAINING LAKE AND ITS CONTROL MECHANISM IS ~~NOT~~ OPERATIONAL.

DRAINAGE AREA: 5.2 sq. mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Woods

Terrain - Relief: Gentle slopes

Surface - Soil: –

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

NONE

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation:

Reservoir:

Length @ Maximum Pool 1.33 (Miles)

Length of Shoreline (@ Spillway Crest) 4.55 (Miles)

ST. JOSEPHS DAM

Broad-Crested Spillway

$Q = CLH^{3/2}$ where Q = Discharge over spillway
C = Co-efficient of discharge
L = Length of spillway
H = Height (head) of water over spillway
w = Width of crest

	H (ft.)	W (ft.)	C	L (ft.)	Q (cfs)	
	1	3	2.65	40	106	
	2	3	2.72	40	308	
	2.5	3	2.81	40	444	
½ PMF	3.0	3	2.92	Spillway 40	606	782
½ PMF	0.5	3	2.63	Embankment 189.3	176	
PMF	3.75	3	3.05	Spillway 40	885	1583
PMF	1.25	3	2.64	Embankment 189.3	698	
Max. observed	3.5	3	2.97	Spillway 40	777	1278
Max. observed	1.0	3	2.65	Embankment 189.3	501	

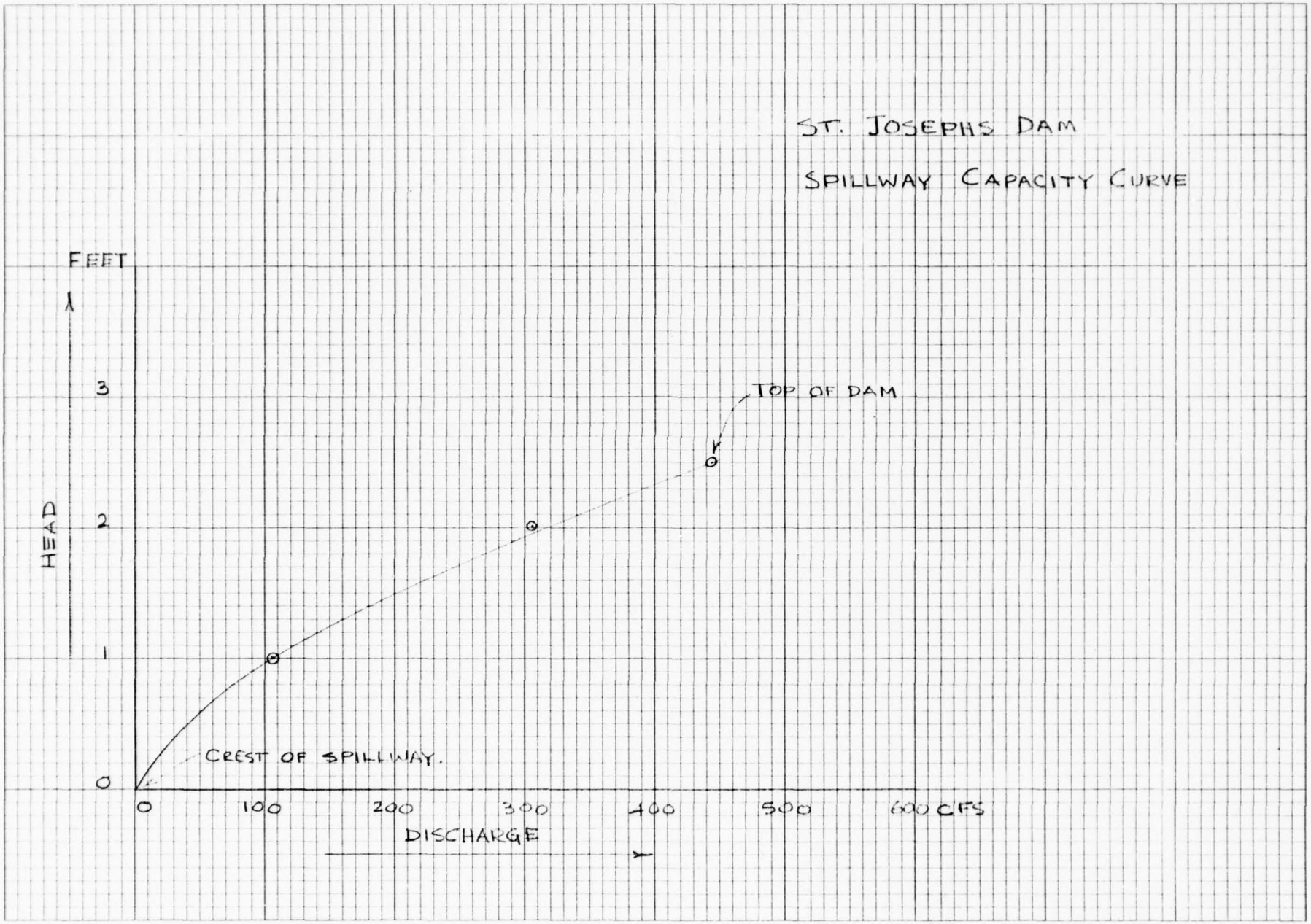
Low Level Outlet

$$Q = C_v C_c A \sqrt{2gH}$$

$$= 0.95 \times 0.66 \times \left(\pi \frac{2^2}{4}\right) \sqrt{2 \times 32.2 \times 18}$$

$= 67$ cfs ≈ 70 cfs.

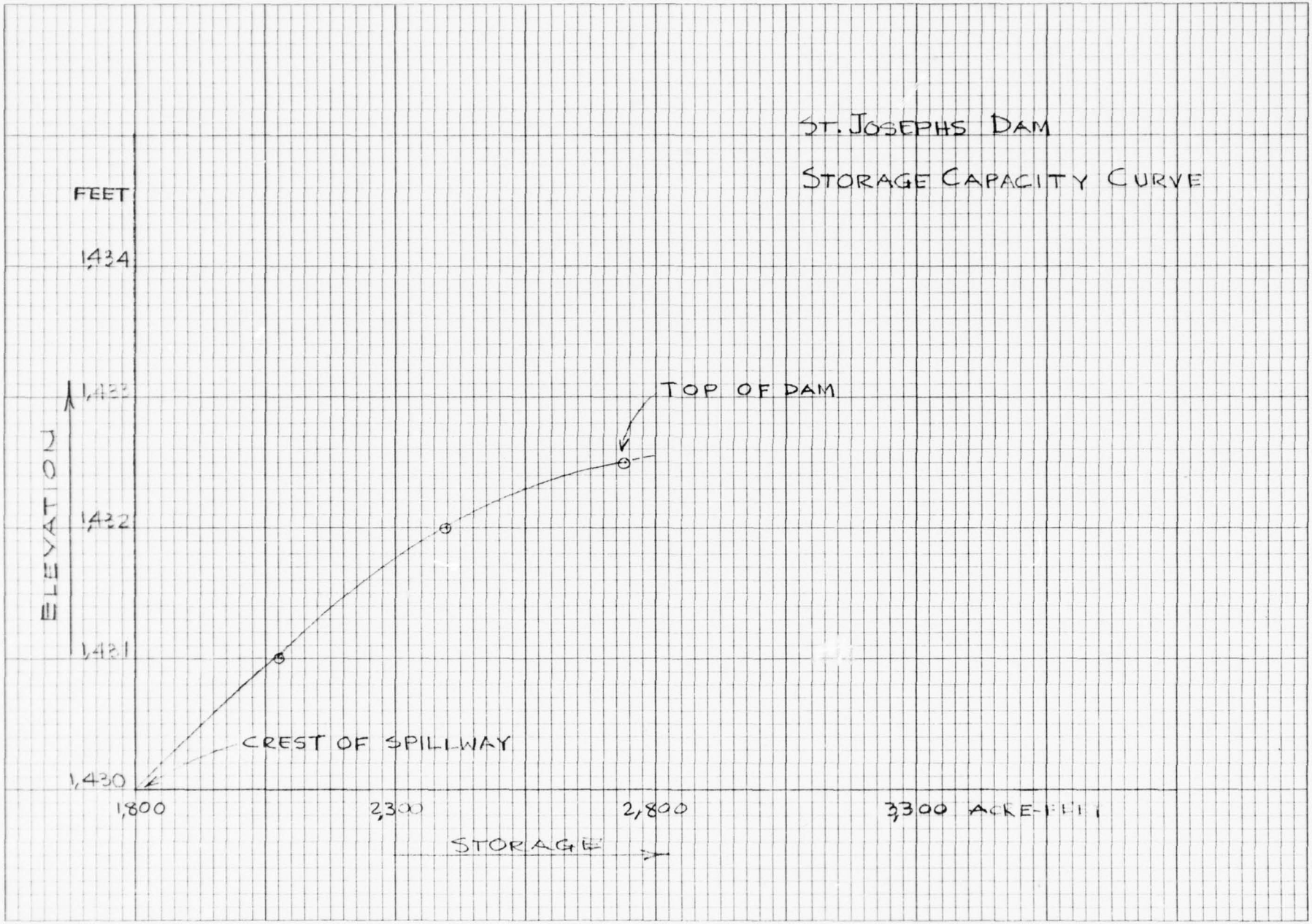
where C_v = Coefficient of velocity
C_c = Coefficient of Contraction
g = Acceleration due to gravity
A = Cross-sectional area
Q = Discharge
H = Head



ST. JOSEPHS DAM

Storage Capacity Curve

Elevation (Feet)	Volume (Acre-feet)
1430	1,800
1431	2,080
1432	2,400
1432.5	2,740



ST. JOSEPHS DAM

D.A. = Drainage area in square miles

L = River mileage from the given station to the upstream limit of the drainage area

L_{CA} = River mileage from the station to the center of gravity of the drainage area

PMP = Probable Maximum Precipitation in inches

t_p = Lag time from mid-point of unit rainfall duration, t_r, to peak of unit hydrograph, in hours.

t_r = Unit rainfall duration, equal to $\frac{t_p}{550}$, in hours.

C_t = Coefficient depending upon units and drainage basin characteristics

t_R = Unit rainfall duration other than standard unit, t_r, adopted in specific study, in hours.

t_{pR} = Lag time from mid-point of unit rainfall duration t_R, to peak of unit hydrograph, in hours

D.A = 5.2 square miles, L = 4.55 miles, L_{CA} = 2.04 miles

PMP = 21 inches C_t = 2.5 (LARGE SWAMP)

C_p = 0.625 from average 640 C_p = 400

$t_p = C_t (L \cdot L_{CA})^{0.3} = 2.5 (4.55 \times 2.04)^{0.3} = 4.88$ hours

$t_r = \frac{t_p}{5.5} = \frac{4.88}{5.5} = 0.89$ hours (Use 1 hr. hydrograph)

$t_{pR} = t_p + 0.25 (t_R - t_r) = 4.88 + .25 (1 - .89) = 4.91$ hrs.

From HMR 33 – Figure 2, Depth - Area - Duration

6 hour % = 111, 12 hour % = 123

24 hour % = 133, 48 hour % = 142

```
**************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
**************************
```

ST JOSEPHS DAM
RESERVOIR ROUTING OF PMF
40 FEET STEPPED MASONRY SPILLWAY

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	1	0	0	0	0	0	0	2	0

JOPER	NWT
5	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 2 LRTIO= 1

RTIOS= 0.50 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

COMPUTE PMF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	0	0	0	0	1

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	5.20	0.	5.20	0.	0.	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	21.00	111.00	123.00	133.00	142.00	0.	0.

TRSPC COMPUTED BY THE PROGRAM IS 0.775

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.	0.	1.00	0.	0.	1.00	1.00	0.10	0.	0.

UNIT HYDROGRAPH DATA
TP= 4.91 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= 10.40 QRCSN= 10.40 RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.65 AND R= 4.38 INTERVALS

UNIT HYDROGRAPH 27 END-OF-PERIOD ORDINATES, LAG= 4.88 HOURS, CP= 0.63 VOL= 1.00

36.	131.	256.	368.	430.	418.	352.	280.	222.	177.
140.	112.	89.	71.	56.	45.	35.	28.	22.	18.
14.	11.	9.	7.	6.	4.	4.			

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.01	0.	10.
2	0.01	0.	10.
3	0.01	0.	10.
4	0.01	0.	10.
5	0.01	0.	10.
6	0.01	0.	10.

7	0.02	0.	10.
8	0.02	0.	10.
9	0.02	0.	10.
10	0.02	0.	10.
11	0.02	0.	10.
12	0.02	0.	10.
13	0.12	0.	10.
14	0.15	0.	10.
15	0.18	0.	10.
16	0.46	0.07	13.
17	0.17	0.07	23.
18	0.13	0.03	40.
19	0.01	0.	60.
20	0.01	0.	77.
21	0.01	0.	84.
22	0.01	0.	81.
23	0.01	0.	70.
24	0.01	0.	59.
25	0.11	0.01	49.
26	0.11	0.01	42.
27	0.11	0.01	38.
28	0.11	0.01	36.
29	0.11	0.01	36.
30	0.11	0.01	37.
31	0.33	0.23	45.
32	0.33	0.23	74.
33	0.33	0.23	130.
34	0.33	0.23	210.
35	0.33	0.23	303.
36	0.33	0.23	394.
37	1.81	1.71	525.
38	2.17	2.07	793.
39	2.71	2.61	1287.
40	6.87	6.77	2185.
41	2.53	2.43	3512.
42	1.99	1.89	4986.
43	0.16	0.06	6194.
44	0.16	0.06	6789.
45	0.16	0.06	6632.
46	0.16	0.06	5877.
47	0.16	0.06	4902.
48	0.16	0.06	3977.
49	0.	0.	3204.
50	0.	0.	2584.
51	0.	0.	2081.
52	0.	0.	1671.
53	0.	0.	1336.
54	0.	0.	1065.
55	0.	0.	849.
56	0.	0.	677.
57	0.	0.	540.
58	0.	0.	431.
59	0.	0.	344.
60	0.	0.	275.
61	0.	0.	220.
62	0.	0.	176.
63	0.	0.	142.
64	0.	0.	110.
65	0.	0.	84.
66	0.	0.	61.
67	0.	0.	32.
68	0.	0.	20.
69	0.	0.	13.
70	0.	0.	12.
71	0.	0.	12.
72	0.	0.	11.

140	0.	0.	10.
141	0.	0.	10.
142	0.	0.	10.
143	0.	0.	10.
144	0.	0.	10.
145	0.	0.	10.
146	0.	0.	10.
147	0.	0.	10.
148	0.	0.	10.
149	0.	0.	10.
150	0.	0.	10.
SUM	23.13	19.45	66442.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6789.	5897.	2618.	912.	66480.
INCHES		10.55	18.73	19.58	19.82
AC-FT		2925.	5196.	5430.	5497.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	7.	11.	20.	30.	39.
42.	40.	35.	29.	25.	21.	19.	18.	18.	18.
22.	37.	65.	105.	152.	197.	262.	396.	644.	1092.
1756.	2493.	3097.	3395.	3316.	2938.	2451.	1988.	1602.	1292.
1040.	835.	668.	533.	425.	339.	270.	215.	172.	137.
110.	88.	71.	55.	42.	31.	16.	10.	6.	6.
6.	6.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3395.	2948.	1309.	456.	33240.
INCHES		5.27	9.37	9.79	9.91
AC-FT		1463.	2598.	2715.	2749.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	13.	23.	40.	60.	77.
84.	81.	70.	59.	49.	42.	38.	36.	36.	37.
45.	74.	130.	210.	303.	394.	525.	793.	1287.	2185.
3512.	4986.	6194.	6789.	6632.	5877.	4902.	3977.	3204.	2584.
2081.	1671.	1336.	1065.	849.	677.	540.	431.	344.	275.
220.	176.	142.	110.	84.	61.	32.	20.	13.	12.
12.	11.	11.	11.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6789.	5897.	2618.	912.	66480.
INCHES		10.55	18.73	19.58	19.82
AC-FT		2925.	5196.	5430.	5497.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE PMF THRU RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.	0.	0.	1	1

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.	0.	0.	1800.

STORAGE=	1800.	2080.	2400.	2740.	0.	0.	0.	0.	0.	0.
OUTFLOW=	0.	106.	308.	444.	0.	0.	0.	0.	0.	0.

STATION 1, PLAN 1, RTIO 1

0.	0.	0.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	3.	3.	4.	
5.	7.	8.	8.	9.	9.	10.	10.	10.	10.
11.	11.	13.	15.	18.	23.	29.	39.	53.	79.
129.	231.	342.	436.	531.	616.	683.	733.	768.	790.
802.	807.	805.	798.	788.	775.	759.	742.	725.	706.
687.	668.	649.	630.	611.	592.	574.	555.	538.	520.
504.	487.	472.	457.	442.	428.	414.	401.	388.	375.
363.	352.	340.	330.	319.	309.	294.	279.	265.	252.
239.	228.	216.	205.	195.	186.	176.	168.	159.	152.
144.	137.	130.	124.	118.	112.	107.	103.	100.	97.
95.	92.	89.	87.	84.	82.	79.	77.	75.	73.
71.	69.	67.	65.	63.	61.	59.	58.	56.	55.
53.	52.	50.	49.	47.	46.	45.	44.	42.	41.
40.	39.	38.	37.	36.	35.	34.	33.	32.	32.

STOR

1800.	1801.	1801.	1802.	1802.	1802.	1803.	1803.	1803.	1804.
1804.	1804.	1805.	1805.	1805.	1805.	1806.	1807.	1809.	1811.
1814.	1817.	1820.	1822.	1823.	1825.	1825.	1826.	1827.	1827.
1828.	1830.	1833.	1839.	1848.	1861.	1878.	1902.	1941.	2008.
2117.	2277.	2485.	2721.	2958.	3169.	3338.	3463.	3549.	3605.
3635.	3646.	3642.	3625.	3599.	3566.	3528.	3486.	3441.	3395.
3348.	3300.	3252.	3204.	3157.	3111.	3064.	3019.	2974.	2931.
2889.	2849.	2809.	2772.	2735.	2699.	2665.	2632.	2600.	2569.
2538.	2509.	2481.	2454.	2428.	2402.	2378.	2354.	2332.	2311.
2291.	2273.	2255.	2238.	2221.	2206.	2192.	2178.	2165.	2152.
2141.	2129.	2119.	2109.	2099.	2090.	2081.	2073.	2065.	2057.
2050.	2043.	2036.	2029.	2022.	2016.	2009.	2003.	1998.	1992.
1986.	1981.	1976.	1971.	1966.	1961.	1957.	1952.	1948.	1944.
1940.	1936.	1932.	1929.	1925.	1922.	1918.	1915.	1912.	1909.
1906.	1903.	1900.	1898.	1895.	1893.	1890.	1888.	1886.	1883.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	807.	798.	700.	413.	32246.
INCHES		1.43	5.01	8.87	9.61
AC-FT		396.	1389.	2460.	2666.

STATION 1, PLAN 1, RTIO 2

0.	1.	1.	1.	2.	2.	2.	2.	3.	3.
3.	3.	3.	4.	4.	4.	5.	5.	7.	9.
11.	13.	15.	17.	18.	19.	19.	20.	20.	21.
21.	23.	25.	29.	36.	46.	59.	77.	108.	190.
319.	447.	614.	805.	997.	1168.	1306.	1408.	1479.	1525.
1551.	1561.	1560.	1548.	1529.	1504.	1475.	1443.	1408.	1372.
1336.	1299.	1262.	1225.	1188.	1152.	1116.	1081.	1046.	1012.
980.	948.	918.	888.	860.	832.	805.	780.	755.	730.
707.	684.	662.	641.	621.	601.	582.	563.	545.	528.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
370.	358.	347.	336.	325.	315.	304.	289.	275.	261.
248.	236.	225.	214.	204.	194.	184.	176.	167.	159.
152.	145.	138.	131.	125.	119.	114.	108.	104.	102.
99.	96.	93.	91.	88.	86.	84.	81.	79.	77.
75.	73.	71.	69.	67.	66.	64.	62.	61.	59.

STOR

1801.	1802.	1802.	1803.	1804.	1805.	1805.	1806.	1807.	1807.
1808.	1809.	1809.	1810.	1810.	1811.	1812.	1814.	1818.	1823.
1829.	1835.	1840.	1844.	1847.	1849.	1851.	1852.	1854.	1855.
1857.	1860.	1866.	1878.	1896.	1922.	1955.	2004.	2083.	2214.
2428.	2748.	3166.	3644.	4124.	4551.	4894.	5149.	5326.	5441.
5507.	5534.	5529.	5500.	5452.	5389.	5317.	5236.	5150.	5061.
4970.	4877.	4785.	4692.	4600.	4510.	4420.	4331.	4245.	4161.
4079.	4001.	3925.	3851.	3779.	3710.	3644.	3579.	3516.	3456.
3397.	3341.	3286.	3233.	3182.	3132.	3084.	3038.	2993.	2949.
2907.	2866.	2827.	2789.	2752.	2717.	2682.	2649.	2616.	2585.
2555.	2526.	2497.	2470.	2444.	2418.	2393.	2370.	2347.	2326.
2306.	2287.	2268.	2251.	2235.	2219.	2204.	2190.	2177.	2164.
2152.	2141.	2130.	2120.	2110.	2101.	2092.	2084.	2076.	2068.
2061.	2054.	2047.	2040.	2033.	2027.	2021.	2015.	2009.	2004.
1998.	1993.	1988.	1983.	1978.	1973.	1969.	1965.	1960.	1956.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1561.	1546.	1356.	826.	64619.
INCHES		2.76	9.70	17.73	19.27
AC-FT		767.	2691.	4917.	5343.

********** ********** ********** ********** **********

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

OPERATION	STATION	PLAN	RATIOS APPLIED TO FLOWS 0.50	1.00
HYDROGRAPH AT	1	1	3395.	6789.
		2	0.	0.
ROUTED TO	1	1	807.	1561.
		2	0.	0.

LIST OF REFERENCES

APPENDIX E

APPENDIX E

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).

3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

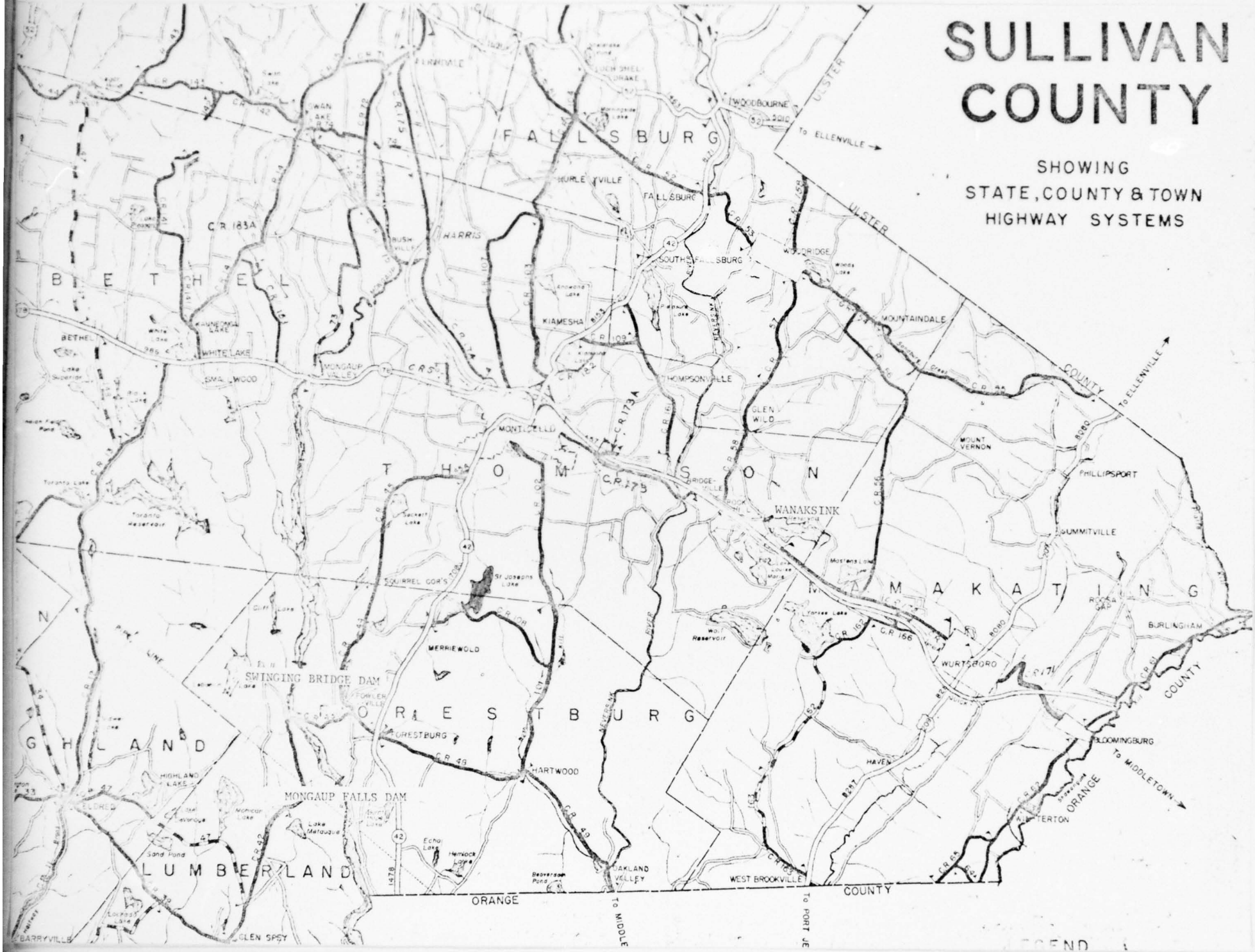
5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

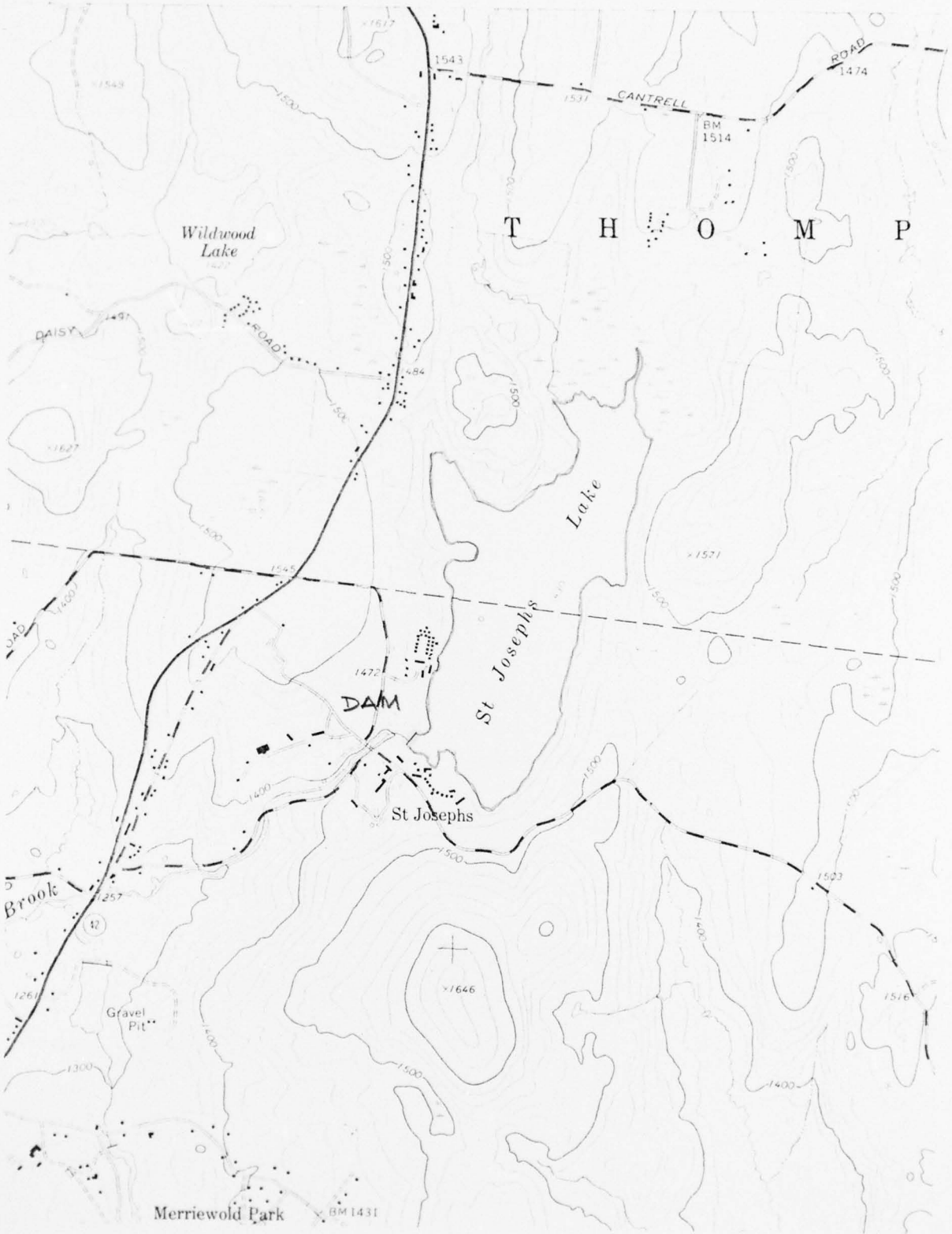
6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX F

DRAWINGS


SULLIVAN COUNTY
SHOWING
STATE, COUNTY & TOWN
HIGHWAY SYSTEMS
FALLSBURG
BETHEL
THOMPSON
MAMAKATING
LUMBERLAND
HIGHLAND
FORESTBURG
ORANGE COUNTY
ULSTER COUNTY
WOODBOURNE
HURLEYVILLE
SOUTH FALLSBURG
KIAMESHA
MONTICELLO
THOMPSONVILLE
WHITE LAKE
SWAN LAKE
BUSH MILLS
HARRIS
MOUNTAINDALE
GLEN WILD
MOUNT VERNON
PHILLIPSPORT
SUMMITVILLE
WANAKSINK
WURTSBORO
BURLINGHAM
BLOOMINGBURG
MIDDLETOWN
MERRIEWOLD
SWINGING BRIDGE DAM
MONGAUP FALLS DAM
HARTWOOD
OAKLAND VALLEY
WEST BROOKVILLE
GLEN SPEY
BARRYVILLE
HIGHLAND LAKE
SQUIRREL GOR'S
St Josephs Lake
Toronto Reservoir
Lake Superior
Lake Metaqua
Echo Lake
Hemlock Lake
Beaverdam Pond
Sand Pond
Mongaup Reservoir
C.R. 183A
C.R. 173A
C.R. 175
C.R. 156
C.R. 171
C.R. 39
C.R. 42
To ELLENVILLE
To MIDDLETOWN
To PORT JE
LEGEND



TOPOGRAPHIC MAP

Map 163
Dam G

163 Del

FORM IW31. 6-18-18-2000 (16-15288)

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

DAM REPORT

August 27, 1914
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the St Josephs Lake Dam.

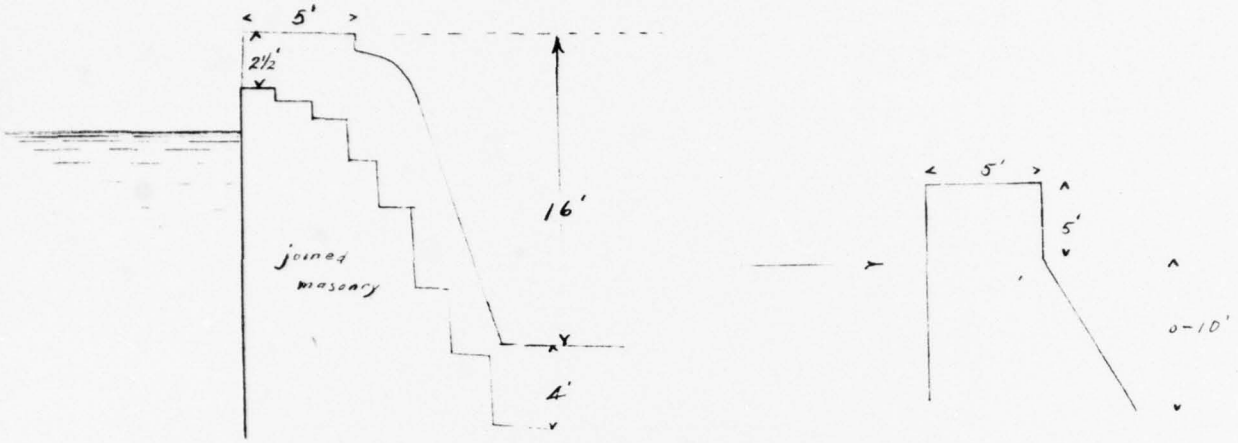
This dam is situated upon the Black Brook
(Give name of stream)
in the Town of Forestburg, Sullivan County,
about 6 miles from the Village or City of Monticello.
(State distance)
The distance down stream from the dam, to the town bridge,
(Up or down) (Give name of nearest important stream or of a bridge)
is about ½ mile.
(State distance)

The dam is now owned by Sisters of St Dominick
(Give name in full)
and was built in or about the year 1905, and was extensively repaired or reconstructed during the year ——.

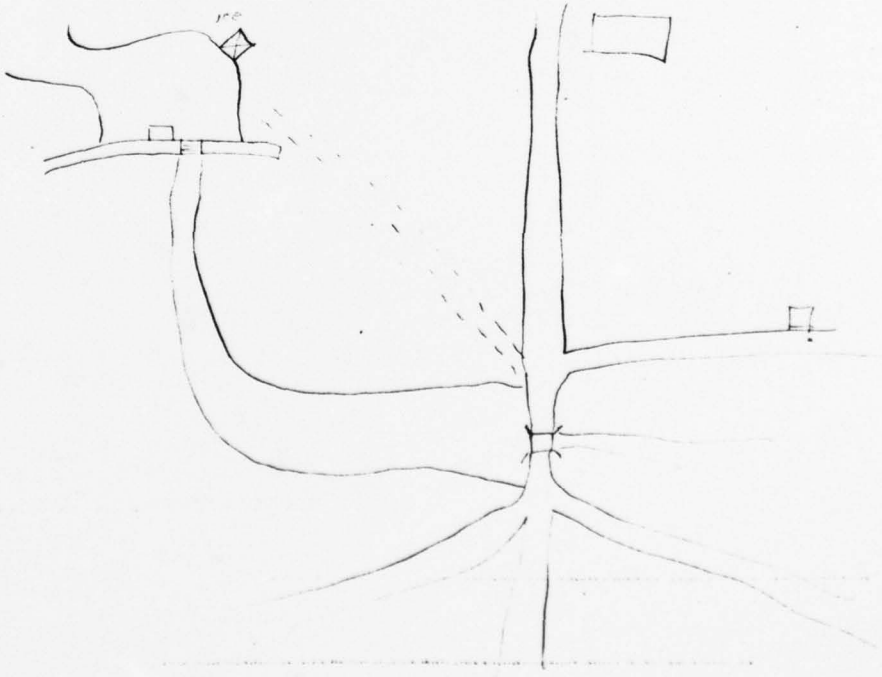
As it now stands, the spillway portion of this dam is built of ashlar
(State whether of masonry, concrete or timber)
and the other portions are built of masonry with concrete joints.
(State whether of masonry, concrete, earth or timber, with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is hard slate and under the remaining portions such foundation bed is slate.

(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)



(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.



The total length of this dam is 225 feet. The spillway or waste-weir portion, is about 40 feet long, and the crest of the spillway is about 2½ feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: two 3' pipes east of spillway

State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

Good

Reported by Richard L. Hyde
(Signature)

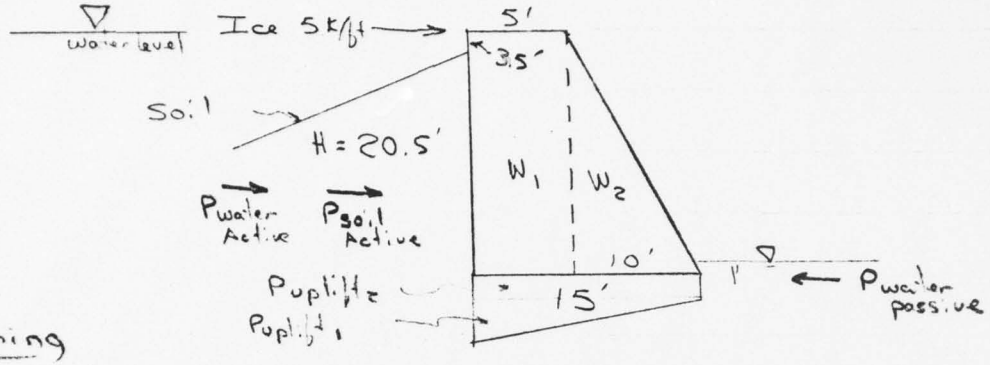
(Address—Street and number, P. O. Box or R. F. D. route)

(Name of place)

(SEE OTHER SIDE)

① RPM 1/18/79

Stability Analysis
St. Joseph's Dam



Overturning

$M_{wt_1} = 102.5 \times .15 \times 12.5 = 192.2$ $\quad P_{wt_1} = 15.4$

$M_{wt_2} = 102.5 \times .15 \times 6.666 = 102.5$ $\quad P_{wt_2} = 15.4$

$M_{water} = \frac{(20.5)^3}{2} \times \frac{.0624}{3} = 89.6$ $\quad P_{water\ Active} = 13.1$

$M_{uplift_1} = (20.5 - 1)\ .0624 \left(\frac{15}{2}\right)^2 \frac{3}{3} = 91.3$ $\quad P_{uplift_1} = 9.1$

$M_{uplift_2} = 1\ (.0624) \frac{15^2}{2} = 7.0$ $\quad P_{uplift_2} = .94$

$M_{soil\ Active} = .3 \left(\frac{.06}{2}\right) \frac{17^3}{3} = 14.7$ $\quad P_{soil\ Active} = 2.6$

$M_{water\ passive} = \frac{.0624}{2} \frac{(1)^3}{3} = .01$ $\quad P_{water\ passive} = .03$

$15.4 + 15.4 - 9.1 - .94 = 20.7\ k$ Reaction of base

$89.6 + 91.3 + 14.7 + 7.0 = 202.6\ k'$ Sum of Overturning Moments

$192.2 + 102.5 + .01 = 294.7\ k'$ Sum of Resisting Moments

$\frac{\text{F.S. overturning}}{\text{normal conditions}} = \frac{294.7}{202.6} = 1.45$

(2) RPM 11/12/79

$$\underset{\text{normal conditions}}{\text{Location of Resultant}} = \frac{294.7 - 202.6}{20.7} = 4.45 \text{ feet}$$

Resultant falls outside middle Third of base

Base = 15 feet middle Third 5 to 10 feet

Sliding

$.55 (20.7) + .03 = 11.4$ K Resisting forces

$13.1 + 2.6 = 15.7$ K Driving forces

$$\underset{\text{normal conditions}}{F.S._{sliding}} = \frac{11.4}{15.7} = .73$$

Computer Run for 5000 #/l.f. Ice Load

F.S. overturning = .97

Location of Resultant = -.50 (outside base of dam)

F.S. sliding = .55

Computer Run for PMF (15" overtopping of dam, 3.75' above spillway), no ice

F.S. overturning = 1.09

Location of Resultant = 1.34 (outside middle Third)

F.S. sliding = .51

Since the dam has withstood these forces without failure (note low sliding factors of safety) the assumed geometry must be incorrect and this analysis invalid. Need More Info.